Weather and Climate Analysis for Nord Region of Cameroun

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1.0 Introduction

The report encompasses the objectives, scope, and relevance of this project using the provided data. In other to draw insights to solve economic, social, and climate challenges facing agriculture, water resources, and health, an in-depth analysis of the provision time series data is required. This analysis begins from data wrangling and cleaning stage before the data analysis, and finally forecasting of trends in temperature, precipitation, humidity, etc.

1.1 Project Objectives

The objectives of this report involves:

i.   To clean and analyze historical weather data.
ii.   To analyze historical weather record and generate insights as related agriculture, water resources, and health.
iii.   To forecast future weather trends and outline the impact on agriculture, water resources, and health.

1.2 Project Scope

The scope of this project is tied to data cleaning, analysis, forecast, and technical report. Furthermore, this technical report is focus only on the following domains: agriculture, water resources, and health.

1.3 Project Relevance

This significance of this project relies heavily on drawing insights to identify, and offer solution through forecasting to the aforementioned domains which are agriculture, water resource, and health.

2.0 Data Management Process

The data management process involves the data sources, format of the data storage, and the necessary quality checks during cleaning.

2.1 Data Sources and Format

The data was extracted and stored on Google drive in a comma separated values format.

2.2 Quality checks

The data quality checks involves ensuring the data type consistency, missing value checks, and duplicate checks and removal.

2.3 Tools Used

The tool engage is python running on a vscode environment. Libraries such Prophet, Numpy, Pandas, Seaborn, and Matplotlib were utilized for this project.

5.0 Results & Key Finding

The result of the analysis are stated below:

5.1 Summary Tables & Charts

Figure 1 below indicate the temperature trend across the years. While the average temperature seems to be very high in previous decades, there appears to be a declining temperature. After the year 2020, there is a sharp decline which appears to be an anomaly that require further investigation.
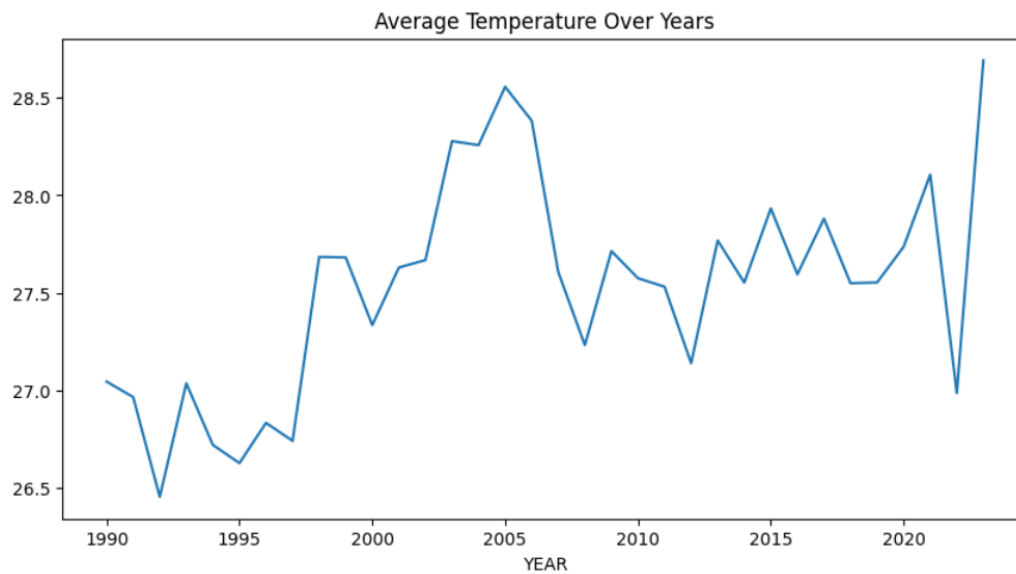

Figure 1: Average temperature across the years

Observing the average monthly temperature distribution across the months as shown in Figure 2, February to May has relatively high temperature indicating dry season while the other months shows low temperature which implies raining season.
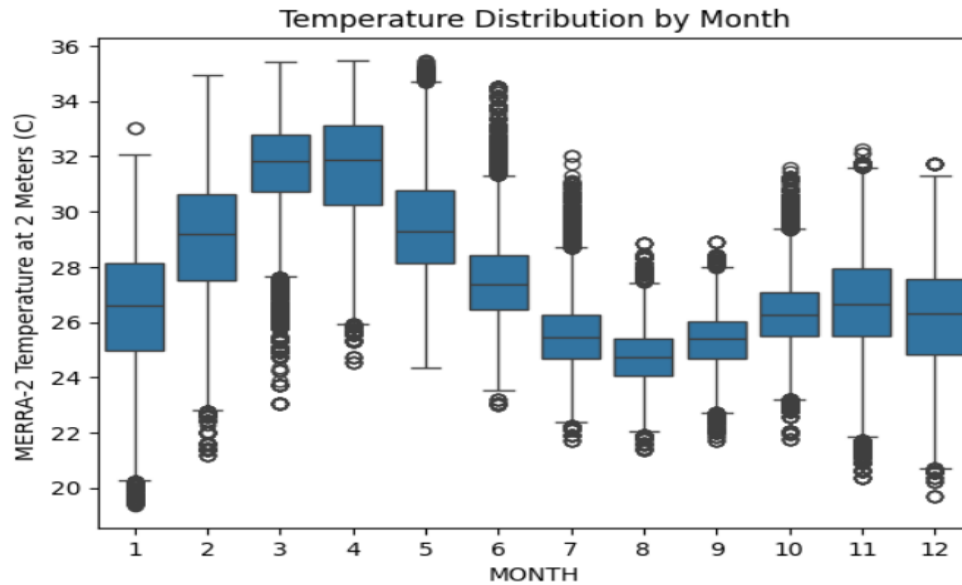
Figure 2: Average Monthly Temperature

The last 10 years shows a stable annual precipitation as compared to the years beyond that, while this may indicate a stable climate condition, it is important to note that this is not the only indicator to evaluate the climate situation of the region. This is shown in figure 3 below;
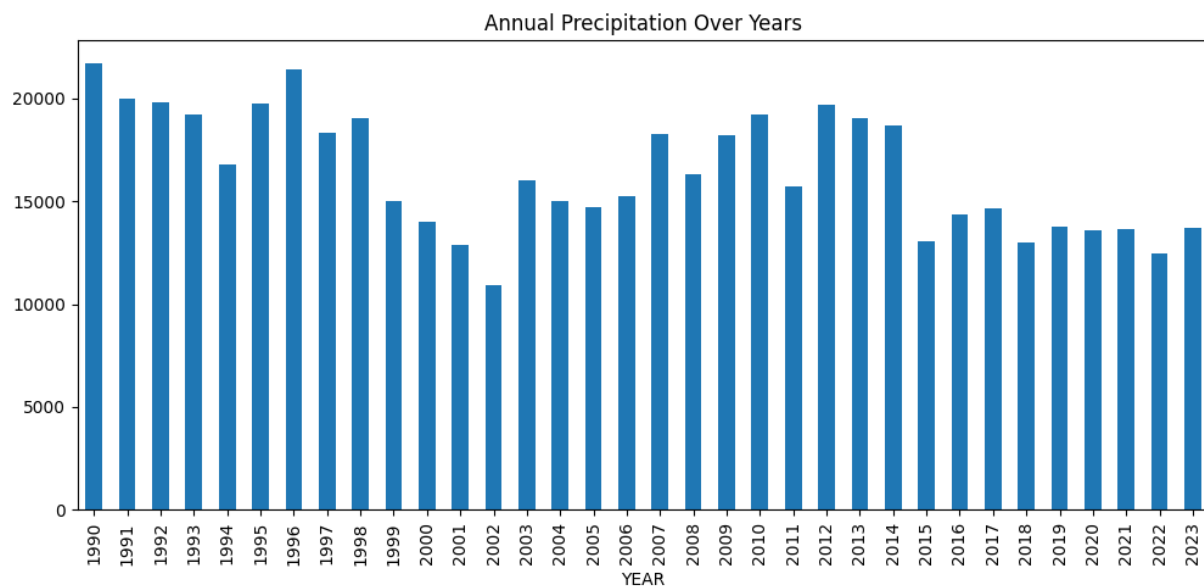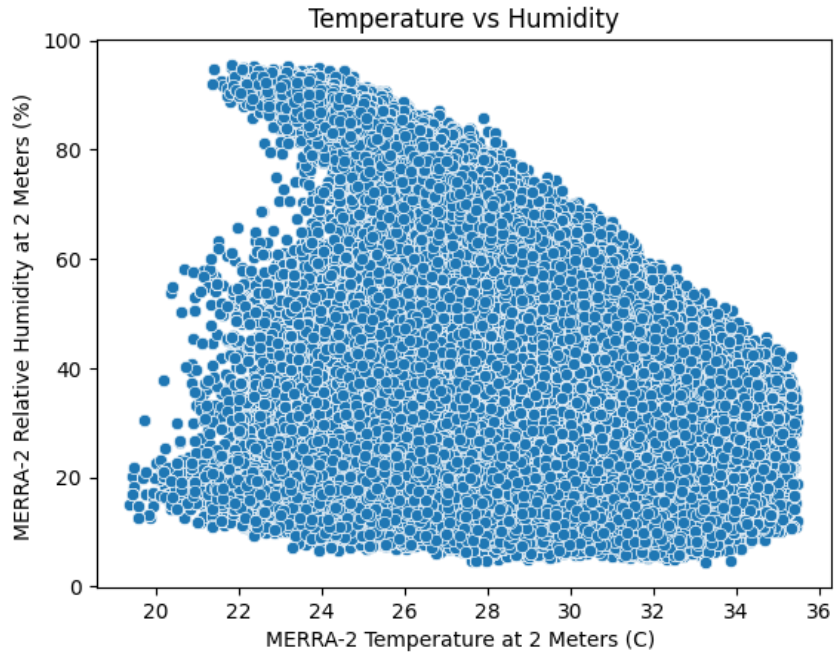

Figure 3: Annual Precipitation over the years

Figure 4: Relative Humidity against Temperature

Figure 4 shows that relative humidity has an inversely proportional relationship with temperature. This implies that, a high temperature leads to low humidity. This is a very common situation during the dry season. The figure 5 below shows that the median temperature during dry season is 28 degrees while during the rainy season, this number slightly drop to 26 degrees.
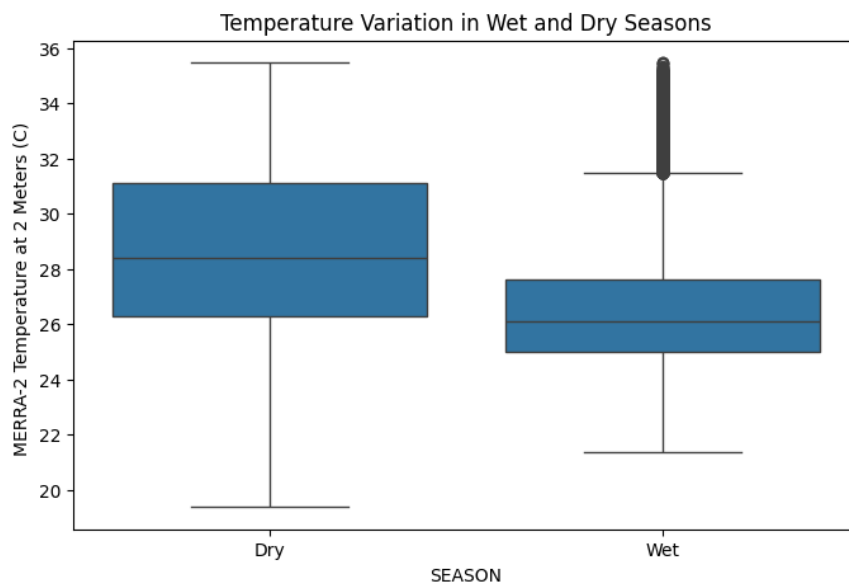

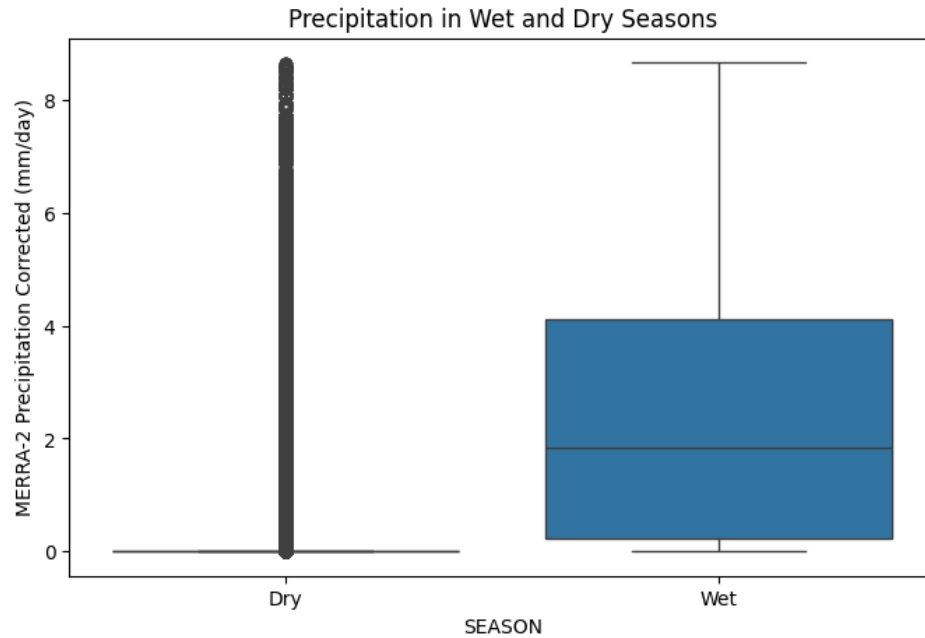Figure 5: Temperature Variations during Wet and Dry Season

Figure 6: Precipitation during Wet and Dry Season

While figure 6 shows that, precipitation predominantly exist in Rainy season which is due to an obvious reason that the season is wet. The reverse is the case during dry season due to high temperature. Figure 7 indicates that the median wind speed is 4m/s during dry season as compared to the rainy season when the median wind speed drops significantly to slightly above 2m/s.
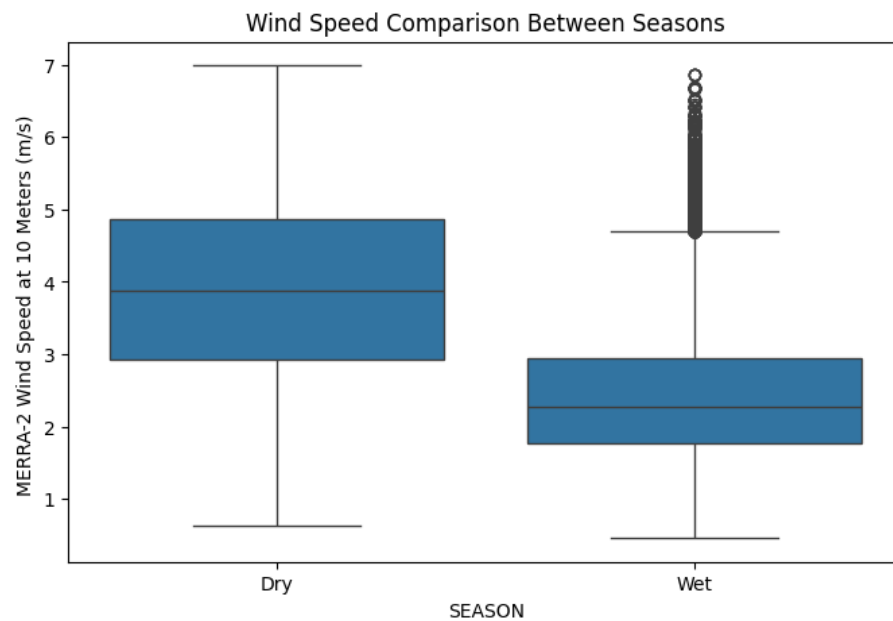

Figure 7: Wind Speed Comparison between Wet and Dry Season

6.0 Conclusion

Agriculture is a domain that rely heavily on the weather condition especially in Africa, and the insight above implies that such region have to ensure availability of water resources during dry season whereby precipitation is almost zero, and the farmers have to be strategic on the type of crops they can plant in dry season. A forecast would give more insight but that is still a work in progress.

Also, there have to be a water reservoir against the dry season. This will enable irrigation to be engaged during dry season. With the annual average temperature being stable for the last 10 years, the temperature will most likely remain stable for the next 5 years why plans are being put in place against possible record high temperature.

High temperature and relative humidity have been proven to affect both plant and animal lives over the years. Therefore, the health domain have to plan into the future by ensuring to make provision for possible health resources for common diseases during such period.